résumé of mean and extreme values for the twenty-five years 1873–98. (2) Chemical analyses of air and water in different parts of Paris, and researches relating to the comparative value of various disinfecting agents. (3) Micrographical investigations, with a view to determining the amount and nature of organic dust in open spaces and in dwelling houses. The work of each section is under the superintendence of an eminent scientific authority, and the control of the establishment is invested in a permanent Committee appointed by the Municipal Council of Paris.

THE earliest authentic record of bubonic plague has hitherto been accepted as dated 300 B.C. Drs. F. Tidswell and J. A. Dick have, however, recently brought evidence before the Royal Society of New South Wales to show that the epidemic of 1141 B.C., described in the First Book of Samuel (chs. iv.–vi.), was true bubonic plague. After the Philistines had captured the Ark of the Covenant and taken it to Ashdod, severe illness broke out among the people. "The hand of the Lord was heavy upon them of Ashdod, and He destroyed them and smote them with emerods." The Ark was afterwards taken to Ekron, and here again we are told "There was a deadly destruction throughout all the city . . . and the men that died not were smitten with the emerods, and the cry of the city went up to heaven." The word "emerod" has usually been taken to mean hæmorrhoids, but in the revised version of the Old Testament it is stated to mean tumour or plague boil. The epidemic in Philistia occurred at the time of the regular plague season, and mice are mentioned in connection with it, which furnishes additional evidence that the epidemic was plague, for a connection between the death of rats and plague at Bombay and elsewhere has been clearly established. Taking all the facts into consideration, there appears to be contained in the few chapters of I. Samuel an account of an epidemic of bubonic plague that occurred more than three thousand years ago, or more than eight hundred years previous to the hitherto accepted historic record.

PART IV. of the sixth revised edition of Foster's "Text-Book of Physiology" has been published by Messrs. Macmillan and Co., Ltd. It deals with the senses, under sight, hearing, taste and smell, and cutaneous and some other sensations. Dr. W. H. R. Rivers has assisted Sir Michael Foster in the revision of these chapters, and his name appears upon the title-page with that of the original author.

IN the *Transactions* of the Nova Scotian Institute of Science has appeared a series of papers, by Prof. MacGregor and his pupils, on the application of the ionic hypothesis to mixtures of solutions of electrolytes. Vol. x. contains a paper by Mr. J. Barnes treating of the viscosity of mixtures of solutions of various salts of sodium, potassium and barium, in which it is shown that general formulæ developed by Prof. MacGregor hold in this case also. Given data as to the viscosity and electrical conductivity of the constituent solutions, the viscosity of dilute solutions of the salts under consideration can be predicted by the dissociation theory within the limits of experimental error.

THE additions to the Zoological Society's Gardens during the past week include a Silver Pheasant (*Euplocamus nycthemerus*, ♂) from China, presented by the Rev. J. O. Coussmaker; a Greater Black-backed Gull (*Larus marinus*), European, presented by Mr. W. Baker; two Starred Lizards (*Agama stellio*) from Egypt, presented by Mr. Stanley S. Flower; a Green Lizard (*Lacerta viridis*), European, presented by Mr. W. J. R. Elgy; two Grey Struthideas (*Struthidea cinerea*) from Australia, a Bennett's Wallaby (*Macropus bennetti*) from Tasmania, deposited; a Black-faced Ibis (*Theristicus caudatus*) from South America, purchased.

OUR ASTRONOMICAL COLUMN.

COMET 1899 V.—Herr S. K. Winther, of Copenhagen, communicates an ephemeris of this comet to the *Astronomische Nachrichten* (Bd. 152. No. 3930), from which the following is abstracted:—

Ephemeris for 12*h*. *Berlin Mean Time.*

1900.		R.A. h. m. s.		Decl. ° ′
March 23	...	21 38 23	...	+51 58·7
25	...	42 36	...	52 43·1
27	...	46 50	...	53 27·3
29	...	51 5	...	54 11·2
31	...	21 55 22	...	+54 54·8

NEW VARIABLE IN CYGNUS.—In the *Astronomische Naehrichten* (Bd. 152, No. 3629), Mr. A. Stanley Williams, of Hove, draws attention to the variability of the star

$$\text{B.D.} +46^\circ{\cdot}2966 \left\{ \begin{array}{llll} \text{R.A.} & 20\text{h.} & 29\text{m.} & 38{\cdot}0\text{s.} \\ \text{Decl.} + & 46^\circ & 15'{\cdot}2 & \end{array} \right\} (1900).$$

The variable was detected from photographs taken with a Grubb portrait lens of 4·4 inches aperture. The brightness was found to change from 9·1 magnitude, on 1899 October 2, to 10·0 magnitude, on 1900 February 11.

Inspection of reproductions from photographs of the star taken by Prof. Max Wolf confirms the variability. In a photograph taken June 1, 1891 (*Knowledge*, 1891, p. 189), the estimated magnitude of the star is 10·2, while on another taken September 9 and 10, 1891 (*Knowledge*, 1891, p. 188), the estimated magnitude is only 9·6. Most of the observations, visual and photographic, furnish an approximate period of 31·0 days.

ESCAPE OF GASES FROM PLANETARY ATMOSPHERES.—In the *Astrophysical Journal*, vol. xi. pp. 36–43, January 1900, Mr. S. R. Cook, of the University of Nebraska, particularises part of the investigation of Dr. G. Johnstone Stoney, who omitted from his discussions the determination, by the kinetic theory, of the number of molecules which would have a velocity sufficient to enable them to escape from the earth or planet, assuming retarding media to be absent. The present author, in commencing this discussion, refers to this velocity as the *critical velocity* of the gas.

The dynamical constants are computed for four different conditions, including those adopted by Dr. Stoney, Prof. Cleveland Abbe (from balloon ascensions at Paris and Berlin), and the recent theoretical conclusions of Ferrel. From the result, it is concluded that under the most probable conditions there would be practically no escape of the gases nitrogen, oxygen, hydrogen and helium from either the earth or the major planets. An atmosphere like that on the earth, however, would not remain on the moon. Tables are given showing the computed temperatures at which the above gases would possess the *critical velocity* for dissipation at the outer limits of the atmospheres of the various planets.

NEW MODE OF USING THE CONCAVE DIFFRACTION GRATING.—In the current number of the *Mem. Soc. degli Spettroscopisti Ital.* vol. xxviii. pp. 241–244, Dr. G. B. Rizzo, of the Physical Institute at Turin, gives a description of his successful experiments dealing with the manipulation of a Rowland Concave Grating in other than the usual manner. The spectroscope is generally so arranged that the grating and eyepiece or photographic plate are at opposite ends of a rigid beam which keeps them at the constant distance of the radius of curvature of the grating, the plate being placed tangential to the focal curve. This gives for a small distance on either side of the axis a practically *normal* spectrum, and although not normal, the other orders of spectra are all brought to focus on the same focal circle, having as diameter the radius of curvature of the grating. It is evident, then, that whatever order of spectrum is being observed *normally* at the end of the beam, there will be another image, of the same order, on the other side of the central image (which has been symmetrically reflected from the grating without diffraction or dispersion), the lines of which will be in focus along a circle having a radius equal to half the grating's radius of curvature. This second spectrum Dr. Rizzo designates the *internal* spectrum, and its position is defined by the condition that

$$\sin\theta = -2\sin i,$$

where θ is the angle of diffraction,
and i ,, ,, ,, incidence,
reckoned from the centre of the grating.

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This spectrum is of *slightly larger* dispersion than the normal one, and may be brighter, although this will probably depend on the particular grating in question. In the grating used this is shown exceedingly clearly by the reproduction given with the paper of the spectrum of iron photographed in the two spectra, that given by the *internal* position being decidedly longer and more intense than the *normal* spectrum.

Dr. Rizzo investigated this disposition on account of being unable to use the instrument as usually set up, but it is possible that the fact of its being a practical arrangement may be of interest to other workers with the concave grating.

FORTHCOMING BOOKS OF SCIENCE.

Mr. Félix Alcan (Paris) promises :—“ Minéralogie Agricole,” by Prof. Houdaille ; and “ Manuel d'Histologie Pathologique,” by Profs. Cornil and Ranvier.

Mr. Edward Arnold's list contains :—“ A Manual of Elementary Chemistry,” by W. A. Shenstone, F.R.S. ; “ A Manual of Physiography,” by Dr. Andrew J. Herbertson ; “ A Manual of Botany,” by David Houston ; “ A Text-Book of Domestic Science,” by Mrs. S. J. Shaw ; “ The Dressing of Minerals,” by Prof. Henry Louis ; and a new edition of “ Lectures on Sound, Light, and Heat,” by Dr. Richard Wormell, Part ii., “ Chemical Statics.”

Messrs. George Bell and Sons announce :—“ The Comparative Anatomy of Animals,” by G. C. Bourne, vol. i. ; “ The Student's Dynamics,” by Prof. G. M. Minchin, F.R.S. ; “ Elementary Science,” by Dr. D. E. Jones and Dr. D. S. Macnair ; and “ Physiography,” by H. N. Dickson.

Messrs. A. and C. Black's list includes :—“ A Treatise on Zoology,” by Prof. E. Ray Lankester, F.R.S. To be completed in ten parts, Part iii., “ The Echinoderma,” by F. A. Bather, assisted by Dr. J. W. Gregory and E. S. Goodrich ; “ Sexual Dimorphism in the Animal Kingdom : a Theory of the Evolution of Secondary Sexual Characters,” by J. T. Cunningham, illustrated ; “ Studies in Fossil Botany,” by Dr. D. H. Scott, F.R.S., illustrated ; and new editions of :—“ Travels through the Alps,” by the late James D. Forbes, F.R.S., revised and annotated by W. A. B. Coolidge, illustrated ; and “ Introduction to Structural Botany,” Part ii., “ Flowerless Plants,” by Dr. D. H. Scott, F.R.S.

Messrs. Cassell and Co., Ltd., give notice of :—“ Electric Bells, how to make and fit them,” illustrated.

Messrs. J. and A. Churchill's announcements are :—“ An Introduction to Vegetable Physiology,” by Prof. J. Reynolds Green, F.R.S., illustrated ; “ A Treatise on Physics,” by Prof. A. Gray, F.R.S., in three parts, illustrated ; “ Chemistry, an exact Mechanical Philosophy,” by Fred. G. Edwards ; and new editions of :—“ Carpenter's Microscope and its Revelations,” edited by Rev. Dr. W. H. Dallinger, F.R.S., illustrated ; “ A Systematic Handbook of Volumetric Analysis,” by Francis Sutton, illustrated ; “ The Microtomist's Vade-Mecum : a Handbook of the Methods of Microscopic Anatomy,” by Arthur Bolles Lee, illustrated.

The Clarendon Press will publish :—“ The Structure and Life History of the Harlequin Fly,” by Prof. L. C. Miall, F.R.S., and A. R. Hammond ; “ A Catalogue of Eastern Lepidoptera Heterocera in the Oxford University Museum,” Part ii., *Nocturna*, by Colonel C. Swinhoe ; Goebel's “ Organography of Plants,” translated by Prof. I. Bayley Balfour, F.R.S. ; and “ A Text-Book of Arithmetic,” by R. Hargreaves.

Mr. W. B. Clive's announcements include :—“ The Tutorial Arithmetic,” by W. P. Workman ; “ The Tutorial Algebra,” Part i., by R. Deakin ; “ First Stage Physiology ” ; “ Section One Physiography ” ; “ First Stage Hygiene,” by R. A. Lyster ; “ Advanced Inorganic Chemistry (Practical) ” ; “ First Stage Mathematics,” edited by William Briggs ; and “ First Stage Botany,” by Dr. A. J. Ewart.

Messrs. A. Constable and Co. promise :—“ Acetylene Gas,” by Prof. Vivian B. Lewes, illustrated ; “ Auto-Cars and Horseless Carriages,” by Worby Beaumont and Dugald Clerk, illustrated ; an illustrated volume by Sir Dietrich Brandis, F.R.S., on Indian forest trees ; a volume by Percy Newberry, giving a record of the exploration and full description, with hieroglyphics, &c., of the tomb of Rekhmara ; and one by Bertram Blount, on the subject of electro-metallurgy.

In Messrs. J. M. Dent and Co.'s list we notice :—“ The Races of Mankind,” by Dr. Huberlandt ; “ Physiology and Hygiene,” by Drs. Redman and Sieler ; “ An Essay on Mental Culture,” by G. A. Hight ; and “ Forestry,” by Dr. Nesbit.

Messrs. Duckworth and Co. give notice of :—“ Agricultural Botany, Theoretical and Practical,” by J. Percival ; “ A Glossary of Botanic Terms,” by B. D. Jackson ; and “A Handbook of British Rubi,” by Rev. W. M. Rogers.

In Messrs. R. A. Everett and Co.'s list we find :—“ A Handbook of Clinical Veterinary Medicine,” by Frank T. Barton ; and “ A Handbook of Clinical Veterinary Surgery,” by Frank T. Barton.

Mr. Gustav Fischer calls attention to :—“ Die Ohrenheilkunde im Kreise der medizinischen Wissenschaften,” by Dr. E. Bloch ; “ Untersuchungen über den Bau der Brachiopoden,” by Dr. F. Blochmann, zweiter teil ; “ Bericht über die Thätigkeit des Königl. Instituts für Serumforschung und Serumprüfung zu Steglitz. Juli 1896–September 1899,” by Dr. W. Dönitz ; “ Das Aether-Verfahren beim Frühtreiben mit besonderer Berücksichtigung der Fliedertreiberei,” by W. Johannsen ; “Jahresberichte über die Fortschritte der Anatomie und Entwicklungsgeschichte,” edited by Dr. G. Schwalbe, o. ö. neue folge, vierter band, drei abteilungen, litteratur 1898 ; “ Lehrbuch der klinischen Hydrotherapie,” by Dr. Max Matthes ; “ Mitteilungen aus den Grenzgebieten der Medizin und Chirurgie,” sechster band, erstes heft ; “ Untersuchungen über die Möller-Barlow'sche Krankheit,” by Schoedel and Nauwerck ; “ Vorträge, Klinische, aus dem Gebiete der Otologie und Pharyngo-Rhinologie,” edited by Dr. Haug ; “ Die diätetische Küche für Magen- und Darmkranke,” by Dr. Carl Wegele.

Messrs. Gay and Bird announce :—“ Comparative Physiology and Morphology of Animals,” by Le Conte.

The announcements of Messrs. Charles Griffin and Co., Ltd., are :—“ The Principles and Construction of Pumping Machinery: Steam and Water Pressure,” by Henry Davey, illustrated ; “ Road Making and Maintenance,” by Thomas Aitken, illustrated ; “ The Metallurgy of Steel,” by F. W. Harbord, illustrated ; “ The Cyanide Process of Gold Extraction,” by James Park, illustrated ; “ A Dictionary of Dye-Chemicals ; a Compendium of Dyes, Mordants, and other substances employed in Dyeing, Calico-printing and Bleaching,” by C. Rawson, W. M. Gardner and W. F. Laycock, with formulæ, properties, applications, &c. ; “ A Dictionary of Textile Fibres,” by Wm. J. Hannan, illustrated ; “ Practical Coal Mining,” by George L. Kerr, illustrated ; “ Flesh Foods, with Methods for their Chemical, Microscopical and Bacteriological Examinations,” by C. Ainsworth Mitchell, illustrated ; “ Marine Meteorology, for Officers of the Merchant Navy,” by William Allingham, illustrated ; “ Official Year-Book of Scientific and Learned Societies of Great Britain and Ireland,” seventeenth annual issue ; and new editions of “ Gas, Oil, and Air Engines,” by Bryan Donkin, illustrated.

Mr. John Lane promises :—“ All About Dogs,” by Charles Henry Lane, illustrated ; and “ Birds of My Parish,” by E. Pollard, illustrated.

Messrs. Longmans and Co.'s list includes :—“ Malaria, according to the New Researches,” by Prof. Angelo Celli, translated by John Joseph Eyre, with corrections and additions ; and “ A Manual of Surgical Treatment,” by Prof. W. Watson Cheyne, F.R.S., and Dr. F. F. Burghard.

The list of Messrs. Sampson Low and Co., Ltd., contains :—“ The Diuturnal Theory of the Earth, or Nature's System of Constructing a Stratified Physical World,” by William Andrews ; “ Artificial Ice Making and Refrigeration,” by L. M. Schmidt ; “ The Surgical Diseases of the Genito-Urinary Tract,” by Dr. Frank Lydston, illustrated ; and a new edition of “ Instruction in Photography,” by Sir W. de W. Abney, K.C.B., F.R.S.

Messrs. Macmillan and Co., Ltd., give notice of :—“ A Manual of Medicine,” edited by Dr. W. H. Allchin, in 5 vols., vol. i. ; “ Micro-organisms and Fermentation,” by Alfred Jorgensen, translated ; and “ Inorganic Evolution as studied by Spectrum Analysis,” by Sir Norman Lockyer, K.C.B., F.R.S.

Mr. John Murray's list includes :—“ Heredity,” by Prof. J. Arthur Thomson, illustrated ; and a new edition of “ The Natural History of Religion, based on the Gifford Lectures delivered in Aberdeen in 1889–90 and 1890–91,” by Prof. Edward Burnett Tylor, F.R.S.

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